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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,071	06/20/2003	Kyeong Jin Kim	042933/302927	8921
826	7590	09/06/2007		
ALSTON & BIRD LLP BANK OF AMERICA PLAZA 101 SOUTH TRYON STREET, SUITE 4000 CHARLOTTE, NC 28280-4000			EXAMINER ZHENG, EVA Y	
			ART UNIT 2611	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/601,071	Applicant(s) KIM, KYEONG JIN	
	Examiner Eva Yi Zheng	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 7/6/07.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### *Request for Continued Examination*

1. The request filed on July 6, 2007, for a Request for Continued Examination (RCE) under 37 CFR 1.114 based on parent Application No. 10/601,071 is acceptable and a RCE has been established. An action on the RCE follows.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-6 and 9-20 are rejected under 35 U.S.C. 102(e) as being unpatentable by Walton et al (US 2004/0120411).

a) Regarding to claim 1, Walton et al disclose in a Multiple-Input, Multiple-Output communication system ([0004]) in which transmit data is communicated to a receiving station upon a plurality of channels and received as receive data thereat (Fig. 1), an improvement of apparatus for facilitating detection at the receiving station of the transmit data responsive to values of the receive data received at the receiving station, said apparatus comprising:

a selector selectably operable to select a metric calculator value for each of at

least a selected number of the plurality of channels, the metric calculator values selected for at least two of the selected number of the plurality of channels differing from one another (selector 1176 in Fig. 11 perform metric calculation for each channel; [0192]; Table 2 shows that each channel can adapt different transmission modes associated with different SNR values); and

a decoder adapted to receive each metric calculator value selected by said selector and to the values of data (1136 receive output of controller 970 in Fig. 11), once received at the receiving station, said decoder for separately decoding the values of the receive data received at the receiving station upon each of the at least the selected number of the plurality of channels, the decoding performed separately for the receive data received upon separate ones of the selected number of the channels, at complexity levels responsive to respective metric calculator values selected by said selector (1136 also receive receiver input data; [0191]).

b) Regarding to claim 2, Walton et al disclose wherein said decoder comprises a path estimator, said path estimator for estimating the values of the transmit data pursuant to a path length estimation scheme (Viterbi decoder estimate optimum path length [0191]).

c) Regarding to claim 3, Walton et al disclose wherein said path estimator performs separate path-length estimations for each of the selected number of channels (1136a-s in Fig. 11).

d) Regarding to claim 4, Walton et al disclose wherein the path-length estimations performed by said path estimator pursuant to the path-length estimation scheme include

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estimation of path-lengths of at least a selected proportion of possible paths defined by possible of the transmitted data (Fig. 11).

e) Regarding to claim 5, Walton et al disclose wherein the selected proportion of the possible paths of which the estimation of the paths is performed by said path estimator forming said detector is related to the metric calculator value (970 in Fig. 11; [0191-0192]).

f) Regarding to claim 6, Walton et al disclose wherein said path estimator estimates maximum likelihood paths of each of the selected number of channels (Viterbi decoder [0191]).

g) Regarding to claim 9, Walton et al disclose wherein the metric calculator values selected by said selector are selected responsive to communication conditions upon the channels ([0052-0054]; Table 2).

h) Regarding to claim 10, Walton et al disclose wherein said selector is further adapted to receive indications of the communication conditions upon the at least the selected number of the plurality of channels (974 in Fig. 11), and wherein the metric calculator values are selected responsive to the indications provided to the selector (972 in Fig. 11).

i) Regarding to claim 11, Walton et al disclose wherein the complexity levels at which the decoding is performed by said decoder, responsive to the metric calculator values, is inversely related to the communication conditions such that the complexity levels increase when the communication conditions worsen (It is well known that the Viterbi decoder's complexity increase as the signal condition worsen).

- j) Regarding to claims 12 and 20, Walton et al disclose wherein the communication system operates pursuant to an OFDM scheme ([0189]) in which channels are defined upon channel subcarriers and wherein the metric calculator values selected by said selector are representative of communication conditions upon each of the channel subcarriers (Fig. 11).
- k) Regarding to claim 13, Walton et al disclose wherein the metric calculator values are maintained at a storage table, and wherein selection made by said selector is of selected ones of the values maintained at the storage table (972 and 1178 in Fig. 11).
- l) Regarding to claims 14 and 19, Walton et al disclose wherein the metric calculator values are dynamically selected by said selector (970 in Fig. 11).
- m) Regarding to claim 15, Walton et al disclose in a method of Multiple-Input, Multiple-Output communication system ([0004]) in which transmit data is communicated to a receiving station upon a plurality of channels and received as receive data thereat (Fig. 1), an improvement method for facilitating detection at the receiving station of the transmit data responsive to values of the receive data received at the receiving station, said method comprising:
- selecting a metric calculator value for each of at least a selected number of the plurality of channels, the metric calculator values selected for at least two of the selected number of the plurality of channels differing from one another (selector 1176 in Fig. 11 perform metric calculation for each channel; [0192]; Table 2 shows that each channel can adapt different transmission modes associated with different SNR values);
- and

separately decoding values of the received data at the receiving station upon each of the at least the selected number of the plurality of channels (1136 receive receiver input data; [0191]), the decoding performed separately for the receive data received upon separate ones of the selected number of the plurality of channels, at complexity levels responsive to respective metric calculator values selected during said operation of selecting (1136 receive output of controller 970 in Fig. 11).

n) Regarding to claim 16, Walton et al disclose wherein the metric calculator values selected during said operation of selecting are selected responsive to channel conditions of the channels upon which the data is communicated to the received station (974 in Fig. 11).

o) Regarding to claim 17, Walton et al disclose wherein said operation of separately decoding comprises performing maximum-likelihood path estimations of at least a selected proportion of possible paths defined by possible values of the transmit data (Viterbi decoder [0191]).

p) Regarding to claim 18, Walton et al disclose wherein the selected proportions is responsive to the metric calculator values (Fig. 11).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al (US 2004/0120411) in view of Joint Detection and Channel Estimation Algorithms for QS-CDMA Signals Over Time-Varying Channels (Kim and Iltis).

a) Regarding to claim 7, Walton et al disclose all the subject matters above except for the specific teaching that the Viterbi decoder is using QRD technique.

However, Kim and Iltis, disclose an algorithm of combining QRD technique with M-algorithm to estimate channel quality. The QRD-M algorithm reduces computational complexity and improves BER performance (page 845). Therefore, it is obvious to one of ordinary skill in art to combine the teaching of multicarrier communication system of Walton et al with QRD-M algorithm of Kim and Iltis. By doing so, reduce calculation complexity, save time consumption and improve signal quality in multicarrier communication system.

b) Regarding to claim 8, Walton et al disclose wherein the selected portion is related to the metric calculator value selected by said selector (1176 in Fig. 11).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Y Zheng whose telephone number is 571-272-3049. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eva Yi Zheng  
Examiner  
Art Unit 2611

August 29, 2007

A handwritten signature in black ink, appearing to read 'Chieh M. Fan', with a stylized flourish at the end.

CHIEH M. FAN  
SUPERVISORY PATENT EXAMINER